Community Assistantship Program

Revealing a Hidden Oasis: A Site Analysis and Conceptual Master Plan for the Northland Arboretum

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Prepared in partnership with
Regional Sustainable Development Partnerships

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Jamie Tschida
August 28, 2005

Research & Education * Conservation * Recreation

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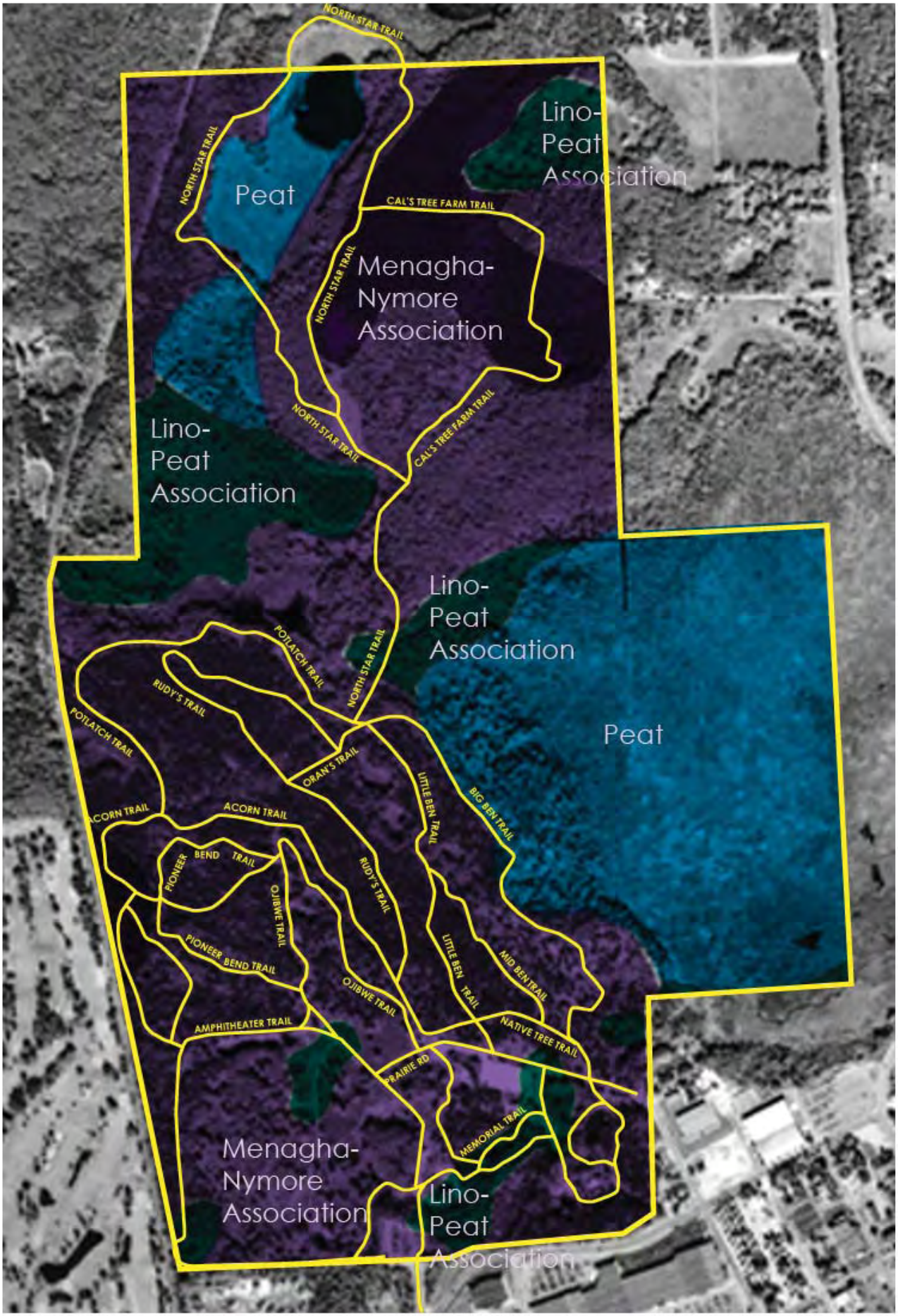
Introduction

Nestled within the urban matrix of the Brainerd-Baxter area, the Northland Arboretum serves as a valuable asset for the surrounding communities. First, the Arboretum helps to conserve rare and unique plant communities, such as one of Minnesota's primary examples of a Jack Pine Savanna. Second, the Arboretum offers the opportunity to provide visitors with a rich education on a number of different things, including, but not limited to, the local ecosystem, plants native to the area, wildlife, horticultural issues and landscape design. Third, the Arboretum offers beautiful amenities that can be used for many recreational activities, such as walking, hiking, birding, gardening and cross-country skiing.

Since the Arboretum began in the 1970s, a number of different ideas for the site have been implemented. Some have remained, many have changed. A lack of continuity has been observed over the years with changes in staff. Through turnover, valuable information pertaining to the site's history has been lost, and the organization and design of the site has suffered as well. It is imperative that plans and goals be made for the long-range future of the site to improve the status of the Arboretum and to more fully develop the ideas of its mission.

This report will make recommendations for a Master Plan and long-range management of the Arboretum. These recommendations are based on three months of research on the physical aspects of the site and are meant to begin the discussion among the Executive Director, Board of Directors and other stakeholders about the Arboretum's future to develop a more detailed plan that can be managed and maintained.

Research & Education * Conservation * Recreation



Aerial Photo: Minnesota DNR
Soil Information: Crow Wing County Soil Survey, 1965

Location

The Arboretum is located between the cities of Brainerd and Baxter, in the geographical center of the state of Minnesota. The population of Brainerd is nearly 14,000 and the population of Baxter is nearly 6,000 people. However, the number of people in the area grows dramatically in the summer, as it is a popular tourist destination with the attraction of the abundance of lakes.

The city of Brainerd was founded in 1870 when the Northern Pacific Railroad decided its Mississippi River crossing should be located there. The city's industries were dominated by railroad shops and yards and sawmills as it became the center for railroad and wood products in north central Minnesota. Therefore, logging and the railroads have played a significant part in the area's history.

The closing of the Brainerd Landfill in 1972 led to the establishment of the Arboretum.

The Nature Conservancy owns 160 acres of land running through the Arboretum, known as the Paul Bunyan Savanna Preserve. This land contains a rare jack pine savanna habitat, the largest of four jack pine savanna remnants in the state of Minnesota.

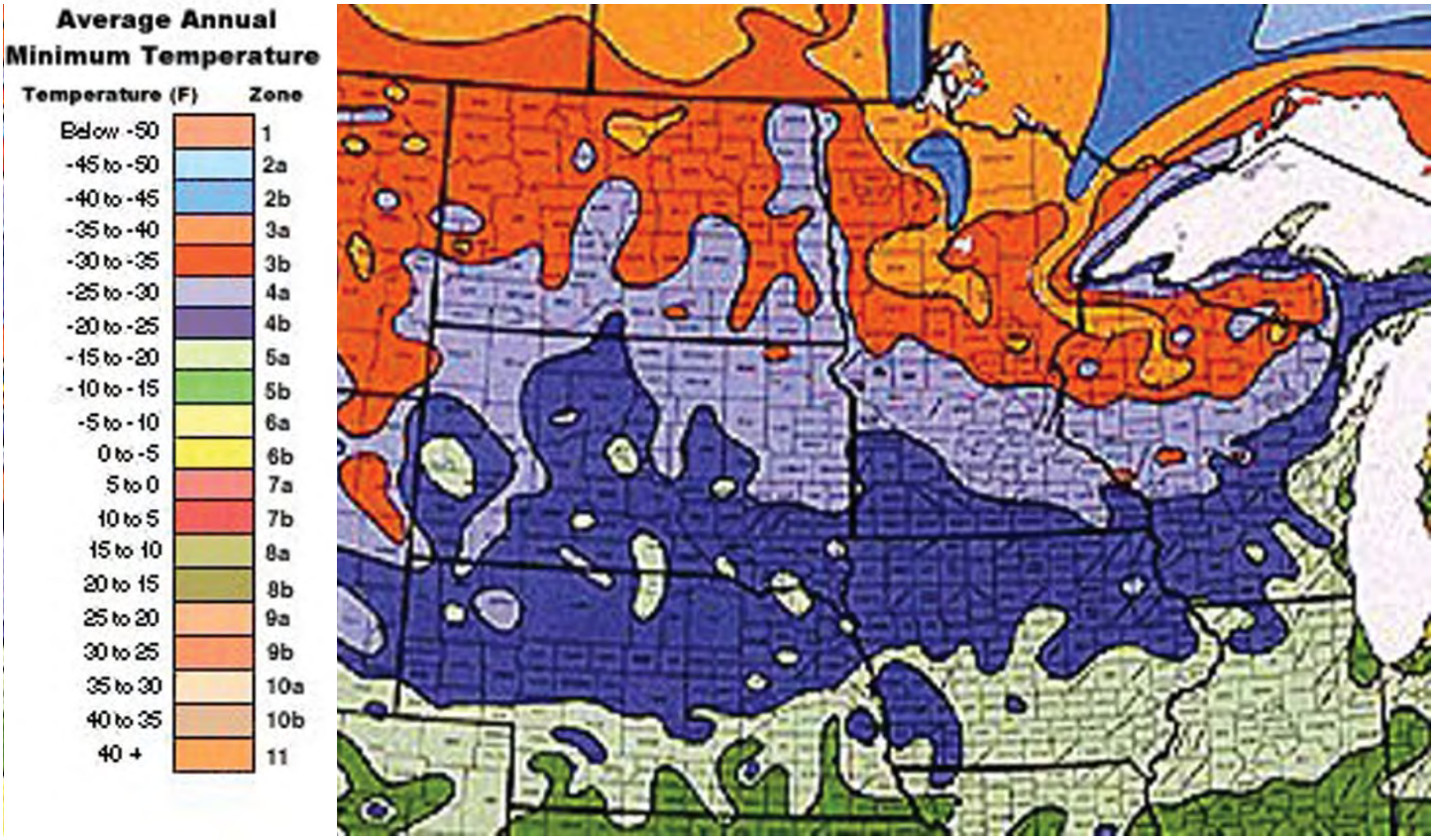
Geology

The physical features of the landscape were largely formed by the recession of Glacial Lake Brainerd, which left sand dune deposits in the area.

As the ice of the glacier retreated northward, few stabilizing plants could establish because of strong north winds that likely created a tundra environment. The wind picked up sand and loose outwash sediments from the surface of the ice, depositing these small particles into sand dunes (Jirsa et al 70).

Soils

According to the 1965 Soil Survey of Crow Wing County, most of the soil on the site is of the Menahga-Nymore Association. These soils are described as droughty and low in fertility and are, therefore, not good for agricultural uses. In the wetland areas, the soil is Peat or of the Lino-Peat Association. Peat is partly decomposed plant remains found in open wet bogs and sedge meadows, and it supports some woody plants while providing good wildlife habitat. Soils of the Lino-Peat Association are poorly drained and wet.



USDA Plant Hardiness Zone Map, 1990

Site Analysis

Climate

The Arboretum is located in USDA Hardiness Zone 3b, with the average annual minimum temperature ranging from -35 to -30 degrees Fahrenheit. In comparison, the Minneapolis-St. Paul area is slightly more mild, located within zone 4a with an average minimum temperature of -30 to -25 degrees Fahrenheit.

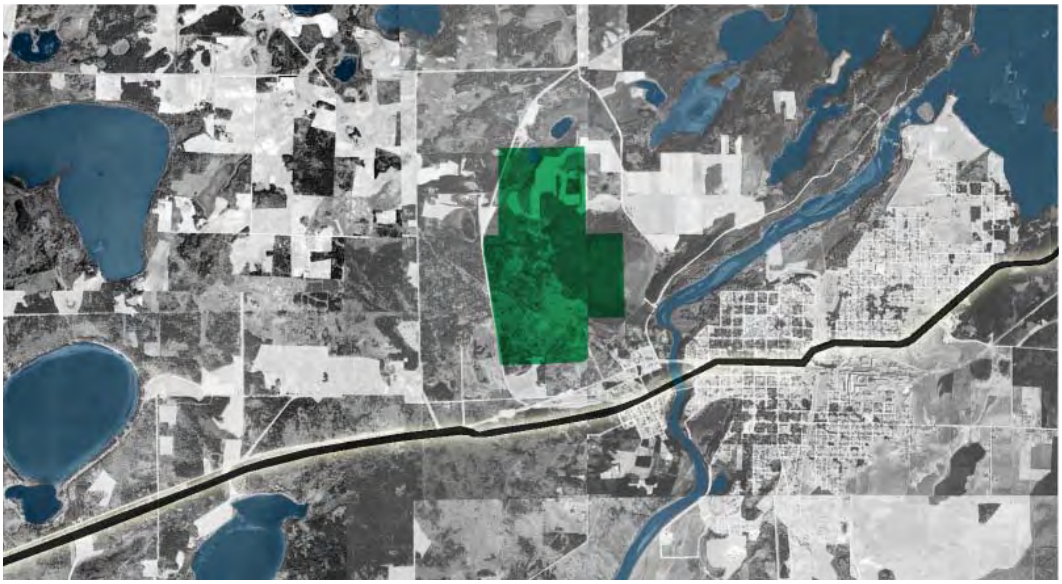
The spring frost date is usually around May 31. The fall frost date is usually around September 21. The growing season is usually 120 to 130 days long. Annual precipitation is generally 25 to 28 inches.

Plant Communities

The dominant plant community on the site is Jack Pine Savanna. Approximately half the acreage of the Nature Conservancy's land consists of this plant community, which is being restored to savanna, with 10 to 20 Jack Pine trees per acre. These are open-grown Jack Pines with native grasses and wildflowers providing the ground cover, including Big Blue Stem, Pasque Flower, Lead Plant and Indian Grass. The presence of fire at relatively frequent intervals is necessary to sustain this plant community.

Aspen, Paper Birch and Red Pine are also found frequently throughout the site. With the absence of fire, White and Red Pines may begin to succeed the Jack Pine Savanna, though the Nature Conservancy's restoration efforts may protect the savanna.

There are some areas of hardwoods, with several different species of oak trees growing on the site. Areas of emergent and aquatic vegetation can also be found in the wetland areas, which take up a fairly large proportion of the site. However, some wetland areas are of fairly poor quality with little diversity, especially the wetland areas near the old entrance to the Arboretum.



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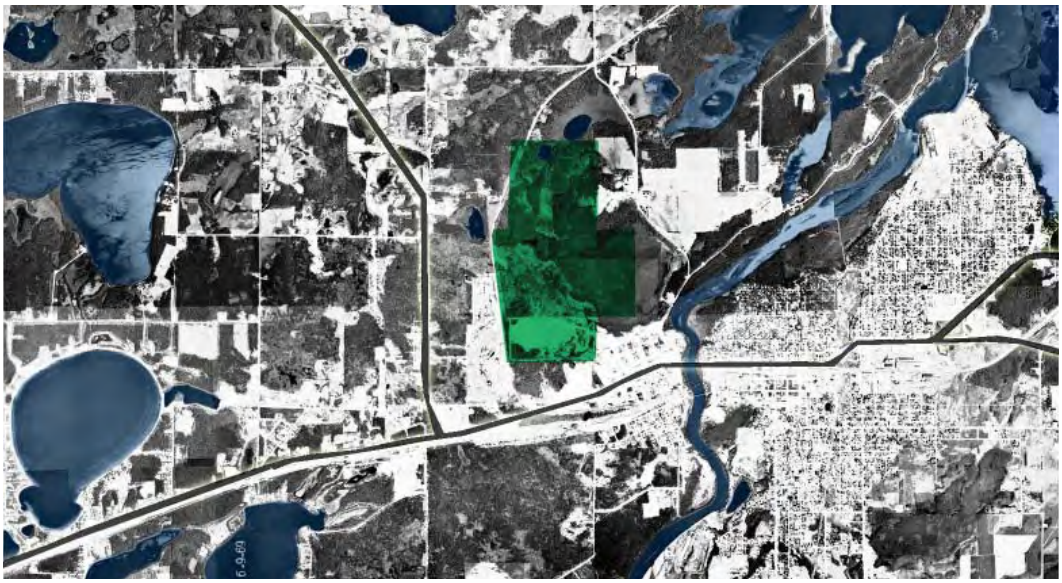

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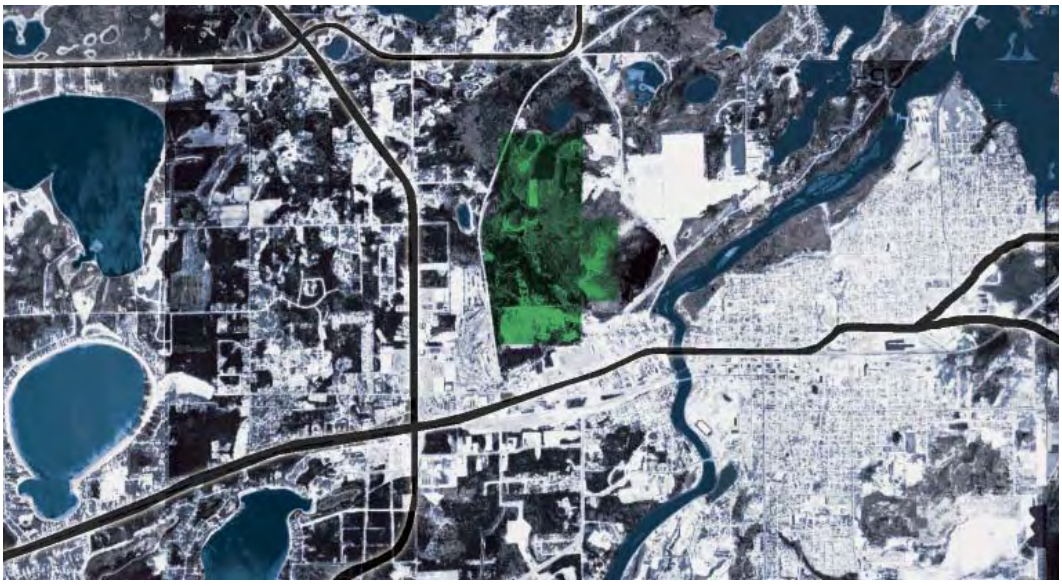

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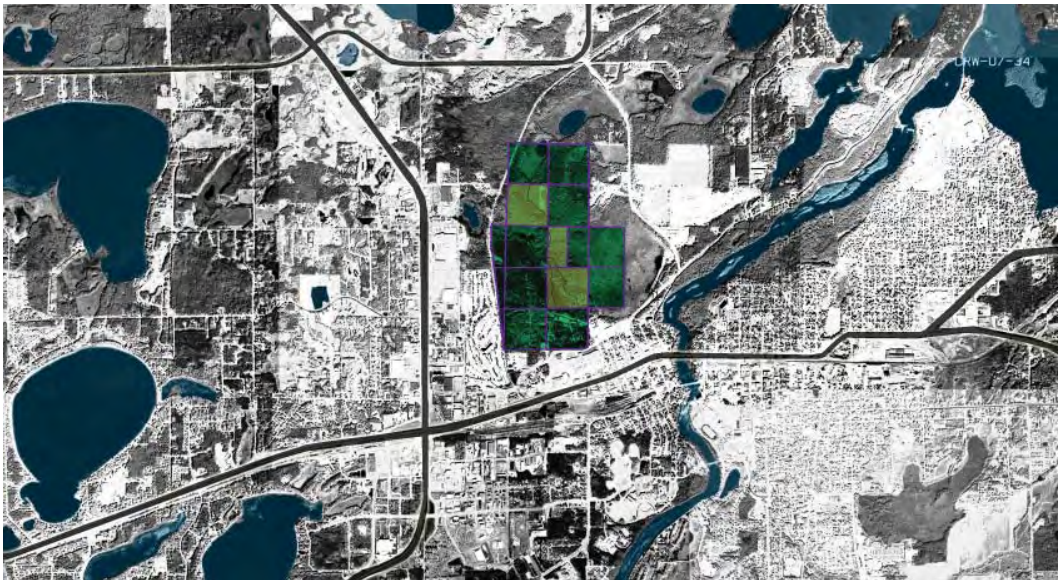


2004

Circulation

There is already a well-established trail system throughout the Arboretum, much of which is groomed for use by The Brainerd Nordic Ski Club in the winter. However, there is a lack of organization and hierarchy with the trail system. Certain trails allow vehicular traffic, but these designations are unclear.

Land Use

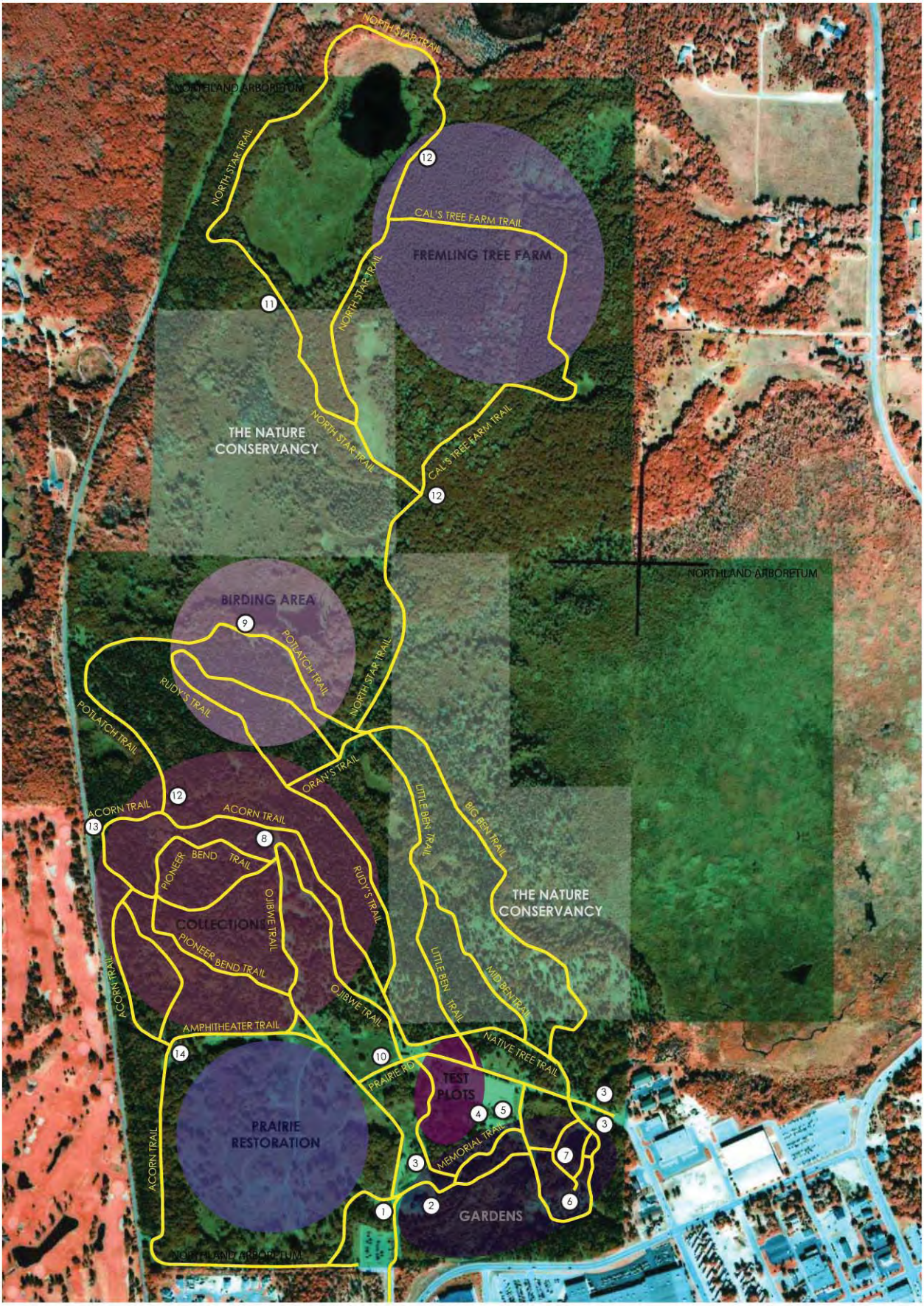
The Arboretum is located in a very urbanized area. The growing urbanization of the area can be witnessed in historic aerial photographs, as pictured here from the University of Minnesota's Borchert Map Library Collection. The current area where the Arboretum is located is highlighted in green, bodies of water are highlighted in blue and the impervious surfaces are highlighted in white.

The city of Brainerd has long been an industrial center for the region, and the city of Baxter has recently experienced significant growth with the development of lands adjacent to the Arboretum into primarily commercial land uses.

The Westgate Mall in Brainerd is located directly south of the Arboretum, and "big box" stores, such as Fleet Farm, Wal-Mart, Target and Home Depot are located nearby in Baxter, to the west of the Arboretum. It is anticipated that this will be a trend in the area, with the expected development of land formerly used as a golf course to the immediate west of the Arboretum.

This trend of urbanization is resulting in increased runoff onto the site due to the increase in impervious surfaces from parking lots and buildings. This has significant consequences for the air and water quality relating to the Arboretum, as well as to nearby residences. Flooding problems could also become an issue, as higher water levels are already impacting trails in the Arboretum.

The increase in traffic could also, potentially, benefit the Arboretum in number of visitors.



1. Arboretum Gateway
2. Visitor's Center
3. Picnic Areas
4. Conservatory/Greenhouse
5. Maintenance Building
6. Gazebo
7. Japanese Foot Bridge
8. Council Ring
9. Viewing Platform
10. Playground
11. Elevated Walkway
12. Contemplative Spaces
13. Overlook
14. Amphitheater

0 1/2
kilometers

N

Conceptual Master Plan

This Conceptual Master Plan is just one step toward a full Master Plan. It provides suggestions for program elements and recommendations as to how they should be implemented, but invites further discussion and fine-tuning. The map of the site indicates general areas where different features should be located, including the Arboretum's Collections, Gardens, Test Plots and more natural areas. Recommendations for where certain structural elements should be located are denoted by numbers. The descriptions of different site elements below begin with existing elements and also propose additions, denoted with an asterisk.

Arboretum Gateway

A visitor's first impression of the Northland Arboretum will take place at the entry, which should be easy for visitors to find. Signage must be improved from Excelsior Road, as well as off of the heavily-trafficked highways 210 and 371, and also the Paul Bunyan Trail, in order to lead a multitude of visitors to the Arboretum where they will encounter an area that is distinctly a "gateway."

This gateway will also be marked with prominent signage, friendly workers or volunteers collecting entrance fees and greeting visitors with maps and information, and a formally designed, impeccably well-kept landscape. Currently, the entry is unclear and uncontrolled. The entry will be located near the parking area for the Paul Bunyan Trailhead, and the path from the entry to the Visitors' Center will also be formally designed with plantings, alluring visitors into the site. An outdoor, informational kiosk should be placed just within the entry.

As visitors enter the site, one of the first areas they will view is a Jack Pine Savanna demonstration area. This will provide a glimpse to visitors of the Jack Pine Savanna community. The demonstration will be in cooperation with The Nature Conservancy to hopefully grab people's attention so they are intrigued enough to walk out to the actual Jack Pine Savanna restoration areas, one of the unique aspects of the Arboretum.

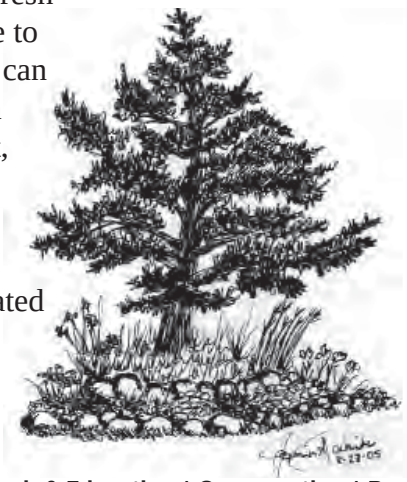
Visitors' Center

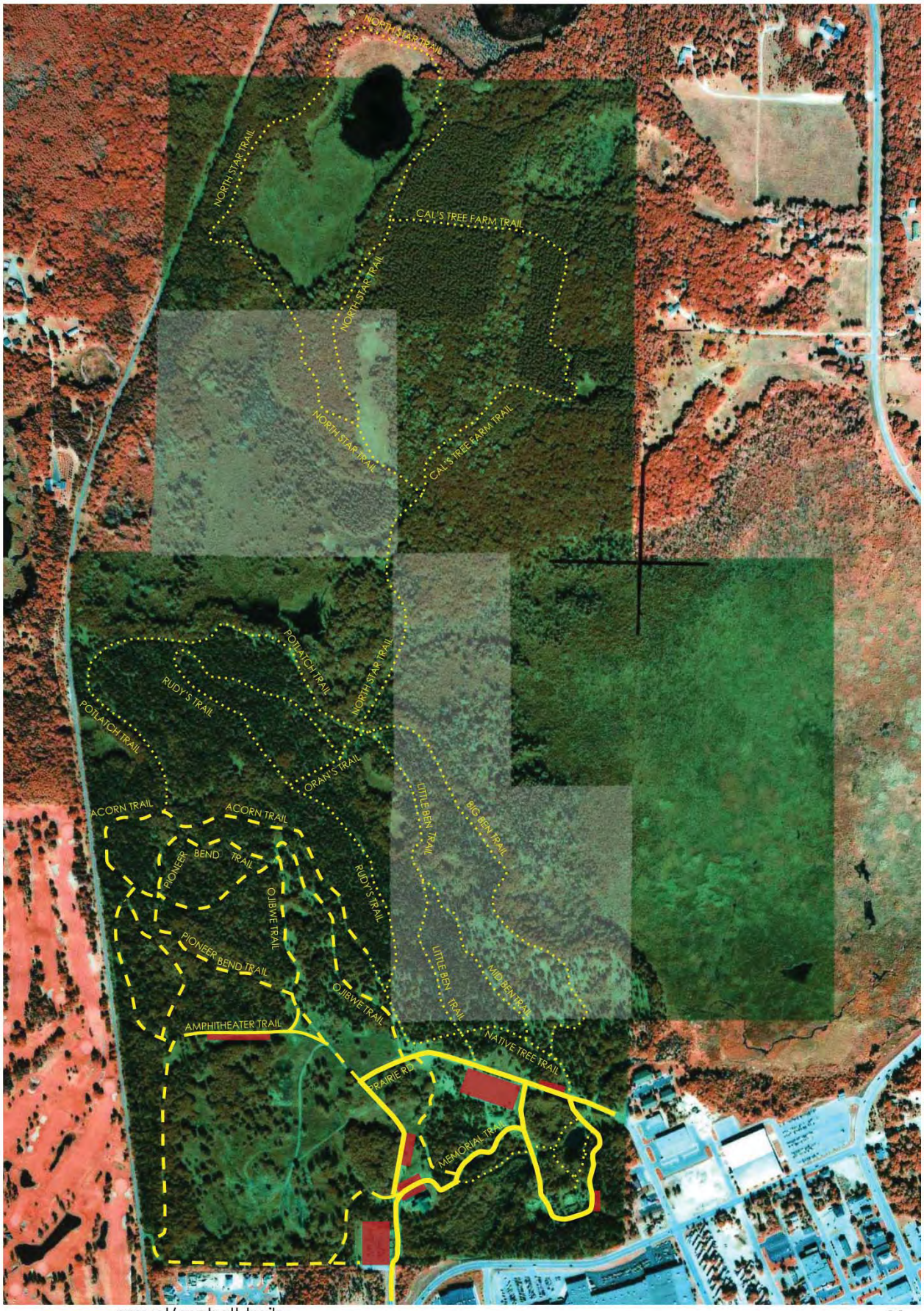
Plantings surrounding the Visitors' Center should continue being enhanced and well-maintained. The building should be a central source for information about the site and educational programs taking place within the site.

The Visitors' Center will also house classes relating to wildlife, plants, gardening, fine arts, crafts and environmental education. There should be a high level of activity within this building.

The Gift Shop should offer guide books to wildflowers, trees and birds, books relating to gardening, forestry, conservation, ecology, landscape architecture and other similar publications to help meet the educational and recreational goals of the arboretum. Postcards and materials directly related to the Northland Arboretum should be sold. Refreshments should be made available to help rejuvenate visitors so they can continue walking the trails with plenty of energy. Bug repellent, Deer Fly Defense Patches, sunscreen and Calamine lotion should also be sold.

The Board Room is located within the Visitors' Center, and is used for board meetings as well as meeting space for rental. The

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ORAN'S TRAIL
ACORN TRAIL
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LITTLE BEN TRAIL
BIG BEN TRAIL
PIONEER BEND TRAIL
OJIBWE TRAIL
RUDY'S TRAIL
PIONEER BEND TRAIL
OJIBWE TRAIL
LITTLE BEN TRAIL
MID BEN TRAIL
AMPHITHEATER TRAIL
NATIVE TREE TRAIL
PRAIRIE RD
MEMORIAL TRAIL
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woodchip trails
dirt/grass Trails
parking
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1/2
kilometers
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Board Room will also house a number of different references and periodicals, serving as a library resource. The design captures a "north woods" feel, as the Arboretum is located near many "up north" lake homes for seasonal residents, with plentiful windows offering framed views of key outdoor focal points surrounding the building.

There should be a sense of enclosure and refuge from the urban matrix of Baxter and Brainerd, and this can be accomplished with the addition of more trees. The visual presence of the parking lot and any pavement should be minimized from Visitors' Center windows. Additional benches should be added outside the Visitors' Center to increase comfortable outdoor seating areas immediately surrounding the building.

Parking

Parking lots should be well-designed so that they do not detract from the visual appeal of the Arboretum. Plantings surrounding parking areas should be well-maintained and provide a sense of enclosure, and barriers, in the form of a curb or fence, should prevent drivers from causing damage to the surrounding plantings.

To accommodate an anticipated increase in visitors, available parking needs to be expanded near the Visitors' Center, as well as other parts of the site.

Trails

There needs to be a clear hierarchy of trails throughout the site. This can be done through varying the width of the trails, the materials used to construct them, and the signage. Signage needs to be consistent throughout the site, though signs can differ slightly in color, shape or size to help to indicate the trail hierarchy. All trails should be well-marked with frequent maps indicating where visitors are located on the site to make for easy navigation.

Driving trails should be paved with asphalt or gravel, as the now sandy paths will be eroded by an abundance of traffic. Signs of erosion along trails are already apparent in some areas.

Trails leading to collections, gardens and exhibits should be covered in woodchips.

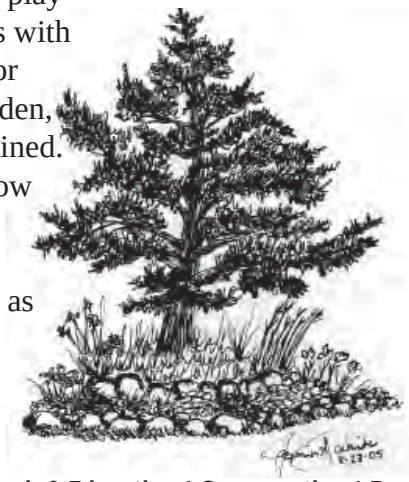
Trails leading to "natural" areas that require little maintenance will remain simple dirt or grass trails.

A boardwalk might be constructed for areas that experience frequent flooding, such as the trails near Whiskey Creek and the Monet Pond.

Minnesota Monet Pond & Japanese Foot Bridge

A reference to Claude Monet's gardens in Giverny, France, this pond could be expanded with the rerouting of paths to help accommodate the increase in water volume flowing into the site as a result of the increase in impervious surfaces in the surrounding region. Additional weeping willow trees could be planted around the borders of the pond, while water lilies and other aquatic plants. The original concept of wildflowers playing off the purple and lavenders with occasional yellows and pinks for accents, emulating Monet's garden, should be enhanced and maintained. Once spring-fed, this pond is now full of stagnant water. An aerating fountain could be added to help cleanse the water as well as improve the aesthetics.

A seating area should be arranged so visitors can admire the Japanese



foot bridge and take in the surrounding scenery.

Landfill Remediation/Prairie Restoration Demonstration

The site of the former Brainerd dump, currently classified as a "Superfund Site," should undergo remediation. This area should be clearly marked, with its boundaries defined. It also requires a better cap so that vegetation may be planted. This could be an ideal area for native wildflowers and grasses to be planted, creating a prairie ecosystem supporting a wide variety of wildlife, all sitting on top of an enormous pile of trash.

Interpretive signs can explain the history of this dump site and the future restoration efforts. The dump has historical ties to the creation of the Arboretum, as well as the Arboretum's unique Jack Pine Savanna habitat. When fires in the dump would get somewhat out of control, they would spread to the Jack Pine Savanna, maintaining this habitat that is so reliant on fire.

There should be expansive views of the area of the old dump site to give visitors a sense of scale and how humans have influenced the land.

Maintenance Building

This building stores heavy equipment, pots, seedlings, shovels, rakes, etc. While the building primarily serves a utilitarian purpose, it is important that the maintenance facilities are maintained themselves so they do not distract from the overall aesthetic of the Arboretum. If less funding will go into maintaining these facilities, it is advisable that the area be blocked from view with structures and plantings.

Collections

Plant collections should be located in designated areas and clearly marked. Collections that fail should be replaced with a new genus or species of plant, or converted into a natural area. These locations should be well-maintained and weed-free. Signs indicating each collection should be consistent. The edges of each collection area should be clean, marked with a stone, wood or edging-plant border.

A shade tree collection and nut tree collection should be added to replace those dismantled by the construction of the Visitors' Center. Other suggested additions: an apple tree orchard, olive tree orchard, hosta collection, ornamental grasses collection and lilac collection.

Gardens

The number of gardens should be slowly and carefully expanded. Each garden should serve a specific purpose, not merely increase the amount of designed space.

Memorial Garden. Currently exists, with a stone wall and flowers. Needs greater enclosure on southwest side, with trees or hedges to create a feeling of greater privacy. A water feature in the center could create a beautiful focal point as well as provide soothing effects. Memorial benches can be located here, as well as segmented garden areas named after beneficiaries.

Healing Garden. A demonstration of a garden that provides healing benefits to those who are physically or emotionally ailing. The garden should be a soothing and contemplative environment.

Sensory Garden. A demonstration of a garden that incorporates a diversity of experiences relating to all five senses.

Conceptual Master Plan

Butterfly Garden. A demonstration to homeowners of what plants to include in their yard and garden to attract butterflies.

Rose Garden. A garden of many different varieties of roses and shrub roses, artfully arranged, with benches to sit and enjoy this beautiful flower. Some roses will be planted for their fragrance, others for their impressive blooms.

Perennial Garden. A garden showcasing all of the different perennial plants that can be grown in the Brainerd-Baxter area, and once planted, will return with beautiful blooms year after year.

Annual Garden. A garden planted strictly with annuals, changing in design from year to year.

Japanese Garden. A garden designed with plants hardy to central Minnesota, arranged in a Japanese-style setting, creating a meditative environment.

Landscaping for Wildlife Gardens. Designed and funded with the help of the DNR, already implemented. A gazebo is located in the garden, and plays host to a number of weddings and other events during the year. Requires continued maintenance.

Memorials

Memorials can be located anywhere throughout the site, in the form of benches, picnic tables, water features, sculptures, engraved pavers, gardens or trees. All memorials should be clearly labeled, permanently. Any memorials sustaining damage should be repaired or replaced in a timely manner. All memorials should be carefully recorded and their locations indicated on a frequently updated map.

Restrooms

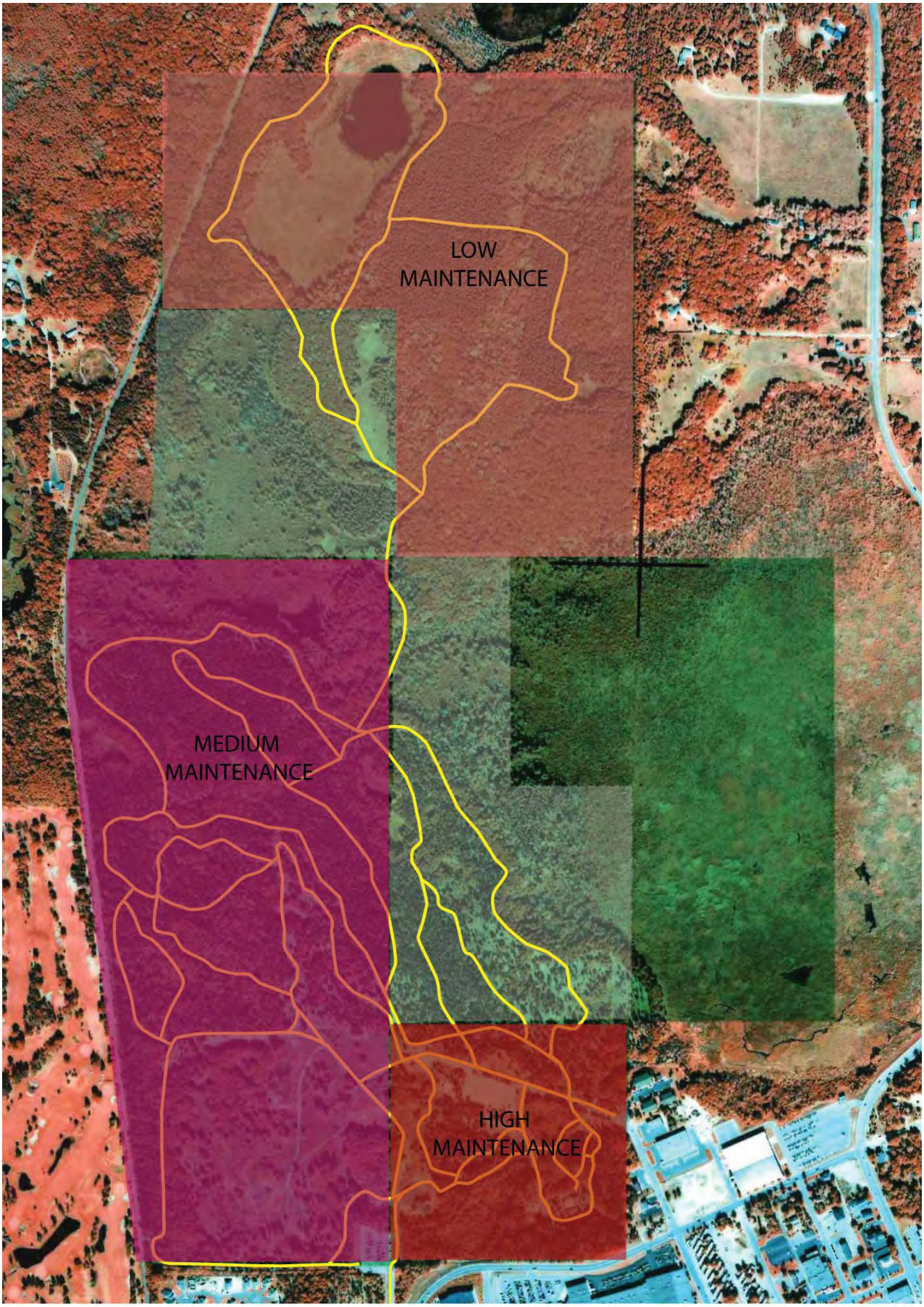
Restrooms should be located in convenient areas around the site to help keep visitors comfortable.

Amphitheater

The amphitheater currently exists, but is overgrown with weeds and grasses and is hardly noticeable. If this structure is to be used, it is imperative that the area be weeded and mowed, the stage area should be repaired and designed with beautiful potted plantings, and benches should be arranged amphitheater-style. The space can be used for educational programs, musical performances, weddings and other events.

Conservatory/Greenhouse*

This building would be used for plant propagation, various scientific studies on plants, and also the display of species that currently do not have hybrids or cultivars



The most high maintenance areas of the Arboretum should be located near the Visitors' Center or Maintenance Building. A large portion of the Arboretum requires some maintenance with weeding and watering, but does not need daily care. Beyond the Nature Conservancy's land, these areas of the Arboretum should be of minimal maintenance as they are the "natural areas" of the site.

that can survive the soil and climate of this region. It would also provide additional shelter for visitors, in a beautiful display area, during inclement weather.

Test Plots/Experimental Nurseries*

Areas should be designated for experimentation, research and trial plantings. These should be overseen by Ph.D. students and other academic researchers. Signs should clearly mark the intention of experimental plots.

Bird-watching Areas*

Elevated walkways or viewing platforms in wooded or prairie areas should be developed so that visitors can more easily view the many different species of birds found throughout the Arboretum. Birding is an extremely popular activity, and partnerships should be made with birding societies for the maintenance of these structures.

Birdhouses should also be added throughout the site and their locations should be marked on a map of the site. Birdhouse-making workshops can be held at the arboretum, and birdhouse kits can be sold in the gift shop so that people can put up birdhouses at their homes, helping to expand the available habitat.

Picnic Areas*

Several picnic areas should be located throughout the site so that people can enjoy a full day experience amidst the beauty of the Arboretum. Picnic areas should have adequate facilities for trash and recycling, and water should be made available for drinking and washing hands if possible. At least one picnic area should be under a shelter for protection from rain, and screened in since this region is prone to large populations of mosquitoes, deer flies and other pests that would detract from the experience.

Picnic tables and benches should be well-maintained and cleaned periodically. Any picnic tables or benches sustaining damage should be removed and replaced in a timely manner.

Playground*

An area catering to children should be developed to help entice the many families who visit the Brainerd-Baxter area. A whimsical tree house could provide the focal point of the design, with tree swings, sandy play areas and other thoughtfully-designed play equipment that should be safe and well-maintained. The design of the play area should reflect the aesthetics of the Arboretum and not detract from it.

Council Ring*

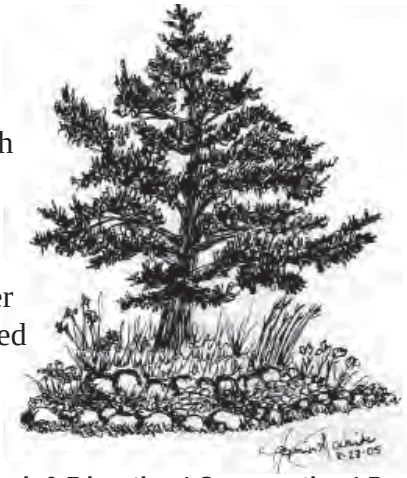
This is an area for smaller group gatherings of two to 20 people. It can be used for education discussions, outdoor meetings, and other casual uses.

Overlook*

This area will provide an overlook of the urban development beyond the arboretum, revealing the dramatic contrast with the green space of the arboretum.

Contemplative spaces*

There should be spaces throughout the site, marked with benches or other sitting areas, for individual contemplation and observation of gardens or nature. Some sense of shelter and enclosure should be provided in these areas.



Conclusion

The Northland Arboretum faces some difficult challenges with increasing development on adjacent land, infertile soil conditions prone to erosion on the site, extreme temperatures, and a designated Superfund Site within its boundaries. Nonetheless, the site has great potential, not just in spite of these conditions but because of them. An Arboretum is meant to be informative, and if it tried to present plants and landscape designs that might be found at an Arboretum in a more temperate climate with rich soil, it would not be providing insight on the local conditions.

As the Arboretum stakeholders move forward, it will be important to keep these conditions in mind and work with them rather than against them. The native plant palette will be most sustainable and should probably be used most frequently. Experimentation with cold-hardiness of certain cultivars or hybrids, as well as the testing of various soil bioengineering techniques to limit and possibly reverse erosion, could be extremely useful.

The issues are not only pertaining to the site, but to the entire watershed as well. With new developments, it will be important that the volume of runoff be limited, and the Arboretum should advocate for biofilter swales, bioretention ponds, vaults and chambers that allow water to infiltrate beneath parking lots, and other means of cleansing and retaining the water. These things can be done in new developments in a very beautiful way that will take care of the water issue and add value to the developer's bottom line, and therefore be beneficial to all parties involved.

The Arboretum needs to work to bolster its mission pertaining to education and conservation. Currently, the primary use of the Arboretum is for recreation, particularly cross-country skiing. It must be understood that recreation, though very important, is just one aspect of the Arboretum, which has multiple purposes.

Coordinating educational presentations with the Extension Service and the Master Gardeners could help support the educational component of the Arboretum, as well as provide a meaningful resource for the public. Volunteers will be integral at the beginning to coordinate these events, however a hired Volunteer Coordinator who will schedule, manage and recruit volunteers, will be a tremen-

dous asset in the future.

A plant expert with a Ph.D. or Master's Degree in horticulture or botany will be an essential addition to the Arboretum's full-time staff. It is imperative that someone with extensive knowledge of plants and trees be available to help with management issues as well as educational information for visitors.

All of these recommendations should be discussed by the Board of Directors, and when funds are available, a licensed landscape architect should be hired to develop a detailed Master Plan that will help the Arboretum plan for its future and achieve its full potential.

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